

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A fluoropolymer producing method
which comprises polymerizing a radical polymerizable monomer in a manner of continuous polymerization in a defined reaction-field to give the fluoropolymer avoiding the use of carbon dioxide,
wherein said defined reaction-field is in a supercriticality-expression state and under a pressure of not higher than 40 MPa and a temperature of not higher than that higher by 100°C than the supercriticality-expression temperature of the defined reaction-field, having a ratio $[\rho_m/\rho_0]$ of not lower than 1.1, where ρ_m is a monomer density and ρ_0 is a monomer critical density,
wherein said supercriticality-expression state is formed in one-component systems in which one kind of a radical polymerizable monomer exists, or in multicomponent systems in which two or more kinds of radical polymerizable monomers exist,
said radical polymerizable monomer comprises a fluorine-containing ethylenic monomer,
and
said fluoropolymer has a weight average molecular weight [Mw] of not lower than 150,000 as determined on the polystyrene equivalent basis, and
a ratio [Mw/Mn] of the weight average molecular weight [Mw] on the polystyrene equivalent basis to a number average molecular weight [Mn] of the fluoropolymer on the polystyrene equivalent basis is higher than 1 but not higher than 3, and

the continuous polymerization is carried in a condition that an amount of the fluoropolymer in a reaction vessel amounts to at least 8 g per liter of the capacity of said reaction vessel in a steady state.

2. (currently amended): A fluoropolymer producing method
which comprises polymerizing a radical polymerizable monomer in a manner of continuous polymerization in a defined reaction-field in the presence of carbon dioxide amounting to 10% or less of the total number of moles of said carbon dioxide and said radical polymerizable monomer to give the fluoropolymer,
wherein said defined reaction-field is in a supercriticality-expression state, having a ratio of $[\rho_m/\rho_0]$ of not lower than 1.1, where ρ_m is a monomer density and ρ_0 is a monomer critical density,
wherein said supercriticality-expression state is formed in one-component systems in which one kind of a radical polymerizable monomer and carbon dioxide exist, or in multicomponent systems in which two or more kinds of radical polymerizable monomers and carbon dioxide exist,
said radical polymerizable monomer comprises a fluorine-containing ethylenic monomer,
and
said fluoropolymer has a weight average molecular weight [Mw] of not lower than 150,000 as determined on the polystyrene equivalent basis, and
a ratio [Mw/Mn] of the weight average molecular weight [Mw] on the polystyrene equivalent basis to a number average molecular weight [Mn] of the fluoropolymer on the polystyrene equivalent basis is higher than 1 but not higher than 3, and

the continuous polymerization is carried in a condition that an amount of the fluoropolymer in a reaction vessel amounts to at least 8 g per liter of the capacity of said reaction vessel in a steady state.

3. (original): The fluoropolymer producing method according to claim 2, wherein said defined reaction-field further is under a pressure of not higher than 40 MPa and a temperature of not higher than that higher by 100°C than the supercriticality-expression temperature of said defined reaction-field.

4 (canceled).

5. (previously presented): The fluoropolymer producing method according to claim 1,

wherein the polymerization of the radical polymerizable monomer is carried out in the presence of a chain transfer agent in a manner of continuous polymerization.

6. (canceled).

7. (previously presented): The fluoropolymer producing method according to claim 1 or 2,

wherein the fluorine-containing ethylenic monomer comprises at least one species selected from the group consisting of vinylidene fluoride, tetrafluoroethylene, chlorotrifluoroethylene and hexafluoropropylene.

8. (previously presented): The fluoropolymer producing method according to claim 1 or 2,

wherein the fluorine-containing ethylenic monomer comprises vinylidene fluoride.

9. (previously presented): The fluoropolymer producing method according to claim 1,

wherein the polymerization of the radical polymerizable monomer is carried out in the presence of a radical polymerization initiator.

10. (original): The fluoropolymer producing method according to claim 9, wherein the radical polymerization initiator is an organic peroxide.

11. (original): The fluoropolymer producing method according to claim 10, wherein the organic peroxide comprises a peroxydicarbonate, a fluorine-based diacyl peroxide and/or a fluorine-free diacyl peroxide.

12. (previously presented): The fluoropolymer producing method according to claim 1 or 2,

wherein the polymerization of the radical polymerizable monomer is carried out in the presence of a nonethylenic fluorocarbon.

13. (previously presented): The fluoropolymer producing method according to claim 2, wherein the polymerization of the radical polymerizable monomer is carried out in the presence of a chain transfer agent.

14. (previously presented): The fluoropolymer producing method according to claim 13, wherein the continuous polymerization is carried in a condition that an amount of the fluoropolymer in a reaction vessel amounts to at least 8 g per liter of the capacity of said reaction vessel in a steady state.

15. (previously presented): The fluoropolymer producing method according to claim 2, wherein the polymerization of the radical polymerizable monomer is carried out in the presence of a radical polymerization initiator.

16. (previously presented): The fluoropolymer producing method according to claim 15, wherein the radical polymerization initiator is an organic peroxide.

17. (previously presented): The fluoropolymer producing method according to claim 16, wherein the organic peroxide comprises a peroxydicarbonate, a fluorine-based diacyl peroxide and/or a fluorine-free diacyl peroxide.

18. (previously presented): The fluoropolymer producing method according to claim 1, which comprises continuously supplying the radical polymerizable monomer to the defined reaction-field and continuously discharging fluoropolymer product from the reaction-field.

19. (previously presented): The fluoropolymer producing method according to claim 2, which comprises continuously supplying the radical polymerizable monomer to the defined reaction-field and continuously discharging fluoropolymer product from the reaction-field.

20. (previously presented): The fluoropolymer producing method according to claim 1, wherein said defined reaction-field consists essentially of one or more kinds of radical polymerizable monomers and optionally additional components in amounts which substantially do not influence the supercriticality-expression pressure or supercriticality-expression temperature of the defined reaction field.

21. (previously presented): The fluoropolymer producing method according to claim 2, wherein said defined reaction-field consists essentially of one or more kinds of radical polymerizable monomers and carbon dioxide, and optionally additional components in amounts which substantially do not influence the supercriticality-expression pressure or supercriticality-expression temperature of the defined reaction-field.

22. (previously presented): The fluoropolymer producing method according to claim 1, wherein those components of the defined reaction-field which substantially influence a phase state thereof consist of one or more kinds of radical polymerizable monomers.

23. (previously presented): The fluoropolymer producing method according to claim 2, wherein those components of the defined reaction-field which substantially influence a phase state thereof consist of one or more kinds of radical polymerizable monomers and carbon dioxide.